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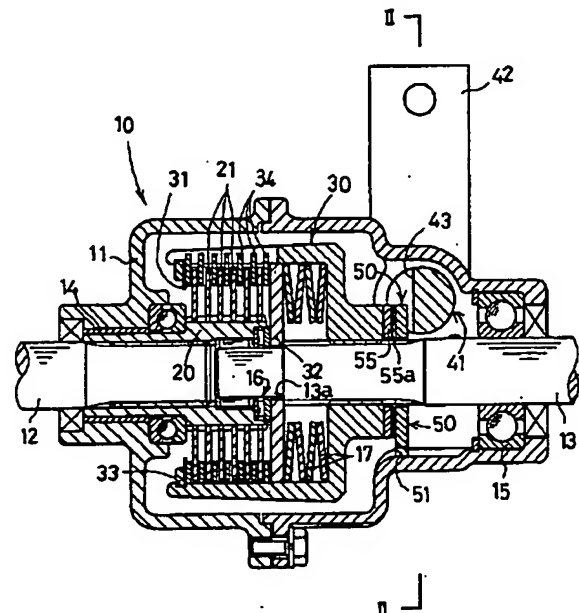
(71) 出願人 591232657  
新日本ホイール工業株式会社  
静岡県浜松市新都田四丁目1番2号  
(72) 発明者 佐藤 伸二  
静岡県浜松市大人見町12番地の45  
(72) 発明者 望月 菊夫  
静岡県引佐郡引佐町井伊谷1881の10

(54) 【発明の名称】 多板クラッチのクリープ防止装置

(57) 【要約】

【目的】クラッチの従動側に構造簡単な制動機を付設することにより、構造が簡単で耐久性の優れたクリープ防止装置を得ることを目的とするものである。

【構成】クラッチケース11に駆動軸12へ連なる内輪20と従動軸13に連なる外輪30とを収め、前記外輪に支持した受圧板32と押圧板31との間に内輪に支持した圧力板21を配し、前記受圧板と外輪との間に配した係合バネ17により押圧板を受圧板側に付勢すると共に、前記外輪の端部に前記係合バネに抗して外輪を押圧し押圧板を後退させるクラッチカム40を設け、前記クラッチカムと外輪の端部との間に前記クラッチケースに回転方向のみ係止した制止板50を介在させ、クラッチの解放操作が行われている間、従動側を制止するようにしたものである。



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## 【特許請求の範囲】

【請求項1】クラッチケースに駆動軸へ連なる内輪と従動軸に連なる外輪とを収め、前記外輪に支持した受圧板と押圧板との間に内輪に支持した圧力板を配し、前記受圧板と外輪との間に配した係合バネにより押圧板を受圧板側に付勢すると共に、前記外輪の端部に前記係合バネに抗して外輪を押圧し押圧板を後退させるクラッチカムを設け、前記クラッチカムと外輪の端部との間に前記クラッチケースに回転方向のみ係止した制止板を介在させる多板クラッチのクリープ防止装置。

【請求項2】請求項1において、前記外輪と制止板とのいずれかには摩擦材が付設されている多板クラッチのクリープ防止装置。

【請求項3】請求項1において、前記外輪と制止板とのいずれかには、硬質の焼結合金からなる摩擦材を付設した多板クラッチのクリープ防止装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】この発明は、農耕用トラクタに好適な多板クラッチに関するもので、特に、クラッチの解放時に若干のトルクが伝動される、いわゆるクリープを防止するための方法および装置に関する。

## 【0002】

【従来の技術】従来、湿式の多板クラッチでは圧力板を潤滑する潤滑油の作用で、クラッチの解放にも駆動軸から従動軸へ若干の駆動力が伝動される結果、従動側が低速で駆動される現象がクリープとして知られている。また、クリープを防止するため、圧力板を挟圧する押圧板と受圧板との間にばねを介在させて強制的に分離させることが行われているが、多板クラッチの圧力板の数が増える程、その効果が減殺される不具合があった。他方、摩擦クラッチを解放したとき従動側を強制的に制止する技術は、耕耘機やトラクタの進行方向を転ずる際に使用される転舵ブレーキで多用されている。すなわち、転舵ブレーキでは動力を断続するクラッチと、従動側となる車輪側を制動するブレーキとに、同じ程度の動力伝達能力が与えられている。換言すれば、同じ程度の大きさのものが用意されている。

## 【0003】

【発明が解決しようとする課題】しかしながら、単なる多板クラッチに転舵ブレーキと同様な制動手段を設けたのでは、構造が複雑となり、装置が大型化する不具合があった。

## 【0004】

【課題を解決するための手段】上記課題は、クラッチケースに駆動軸へ連なる内輪と従動軸に連なる外輪とを収め、前記外輪に支持した受圧板と押圧板との間に内輪に支持した圧力板を配し、前記受圧板と外輪との間に配した係合バネにより押圧板を受圧板側に付勢すると共に、前記外輪の端部に前記係合バネに抗して外輪を押圧し押

圧板を後退させるクラッチカムを設け、前記クラッチカムと外輪の端部との間に前記クラッチケースに回転方向のみ係止した制止板を介在させることによって解消する。また、前記外輪と制止板とのいずれかには摩擦材を付設するのが好ましい。さらに、その摩擦板として硬質の焼結合金が好ましい。

## 【0005】

【作用】駆動軸と従動軸は内輪に支持した圧力板を、外輪に設けた押圧板と受圧板との間に挟持し係合バネによって挟圧して動力の摩擦伝動を可能にしている。また、クラッチカムを操作して外輪を押圧し押圧板を後退させると、外輪に設けられた摩擦板と圧力板との摩擦係合が解除され、動力の伝達が遮断される。前記外輪とクラッチカムとの間には、クラッチケースに係止された制止板が介在し、クラッチカムが操作されると、外輪とクラッチケースとが摩擦係合し外輪の回転が制止される。外輪と制止板とのいずれかに、硬質の焼結合金からなる摩擦材が付設されているから、外輪は係止板によって制止されると共に、過大な引きずりトルクが作用している間、それらの間は適度に滑って従動側に与える衝撃を緩和する。

## 【0006】

【実施例】以下、本願発明を利用した図示の実施例を説明する。図中、10は多板式の湿式摩擦クラッチである。摩擦クラッチ10は軸方向に分離される2個の半部を開口端で重ね合わせボルトによって結合したクラッチケース11を有し、それにはエンジンに連なる駆動軸12と、車輪に連なる従動軸13とが回転可能に支持されている。

【0007】クラッチケース11の内部には駆動軸12の軸端にスプライン結合して支持された内輪20と、従動軸13の軸端にスプライン結合して支持された外輪30とを同軸、かつ内外に配置して支持している。14は駆動軸12を支持した平軸受、15は従動軸13を支持した球軸受である。それら内輪20と外輪30との間には、内輪20に軸方向のみ移動可能に係止された圧力板21と、外輪30に支持された押圧板31、軸方向のみ移動可能にスリットに支持された摩擦板34、および受圧板32とで分離可能に摩擦係合されている。16は前記内輪20と押圧板31との間に介装した針形のスラスト軸受である。

【0008】受圧板32は従動軸13に支持され、前面のスラスト軸受16と後面の段部13aとによって軸方向の移動が阻止されると共に、後面と前記外輪30の端面との間に皿ばねからなる係合バネ17が圧縮状態に縮設され、外輪30を図中右方へ押圧している。また、押圧板31は前記外輪30の開口端内面に軸方向にのみ移動に支持され、内径サークリップ33によって抜け止めされている。かくて、押圧板31は係合バネ17の弾力により受圧板32の方向に付勢され、受圧板32との間

に前記圧力板21と摩擦板34とを挾圧する。

【0009】40はクラッチの操作子たるクラッチカムである。クラッチカム40は図2で示すように、クラッチケース11に回転自在に支持されたカム軸41と、その外端に連結されたカムレバー42、および前記カム軸41の中間部を半円形に切り欠いて作られたかまぼこ形のカム部43とを有する。カムレバー42はクラッチペダルあるいはクラッチレバーなど図示してないクラッチ操作子に連結されており、カムレバー42が回転操作されると、クラッチカム40のカム部43が外輪30の端部を押圧し、図中で左方へ移動させる。その結果、押圧板31が図中、左方へ後退し、圧力板21が滑って動力の伝達となされなくなる。なお、以上の構成は従来市販されている多板クラッチの構成と大差はない。

【0010】こゝで、本願発明では前記カム部43と、外輪30の端部との間には制止板50が配してある。制止板50は従動軸13上に嵌合し、かつ、前記クラッチケース11に回転方向のみ係止されていて、軸方向に若干の移動を許容されるが回転しないように支持されている。55は制動摩擦板であり、必要に応じて外輪30の端面に固定的に取り付けられる。55aは焼結合金で作られた硬質の耐摩材であり、前記制動摩擦板55の一侧に焼付けられている。かくて、クラッチカム40が解放操作されると、制止板50が軸方向に移動し、外輪30の端部に当接する。クラッチカム40が、さらに解放側に操作されると制止板50を介して係合バネ17に抗して外輪30を左方に押圧して移動させる。その結果、摩擦クラッチ10が解放されて駆動軸12と従動軸13との連結が断たれ、動力の伝達が遮断される。

【0011】前記制止板50はクラッチカム40の作動と共に回転している外輪30に摩擦係合し、その回転を制止する。そのため、外輪30は圧力板21と押圧板31、あるいは受圧板32との係合が遮断されると同時に、外輪30の回転を急速に制止し、いわゆるクリープの発生が阻止される。なお、制止板50と外輪30との間に制動摩擦板55を設けることは必須の要件ではないが、これによって制止板50と外輪30との間に摩擦が増え、前記クリープを防止する効果が顕著となる。もっとも、制止板50はクラッチカム40の作動開始と、現実には動力の伝達断たれるまでの僅少時間だけ、大きな制動負荷がかかるので、磨耗を減じるために摩擦板は含油軸受用の材料として公知の焼結合金を貼着するのが好

ましい。

【0012】

【発明の効果】請求項1の発明によれば、摩擦クラッチは遮断されると同時に制止板によって従動側が制止されるので、クリープによって従動側が引き続き回転駆動される不具合が解消される。また、制止板を既存のクラッチカムと外輪との間に介在させる簡単な構造変更によってクリープ排除の効果が得られる。請求項2の発明によれば、外輪と制止板との間は摩擦材によって摩擦力が増し、摩擦面積が小さくても大きな制動力が得られるから装置を小型化できる効果がある。請求項3の発明によれば、摩擦材は硬質の焼結合金とされ、大きな摩擦力が得られる他、クラッチの解放操作から動力が遮断されるまでの間、過酷な摩擦環境に置かれる摩擦材の耐久性が損なわれずに済む。などの効果がある。

【図面の簡単な説明】

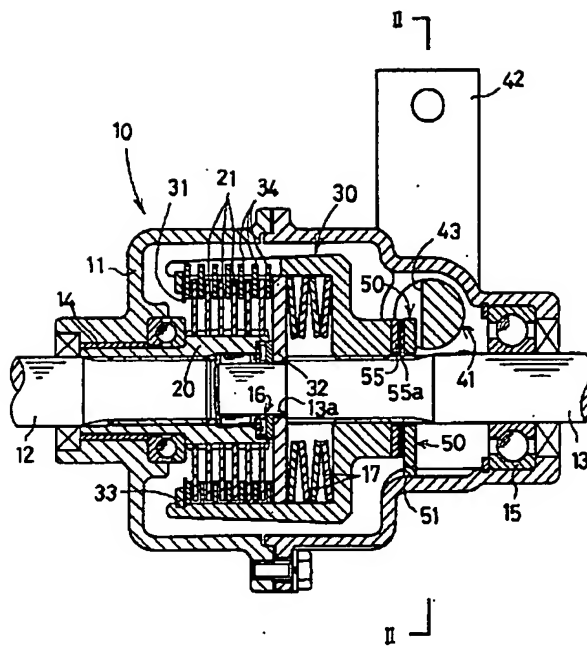
【図1】本願発明の一実施例である多板クラッチの縦断面図である。

【図2】そのI I - I I 断面図である。

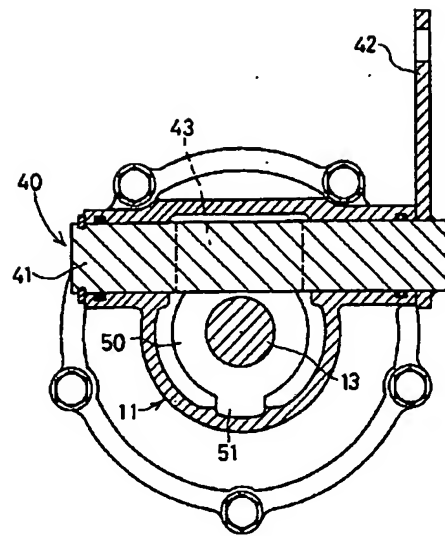
【符号の説明】

10・・・多板式の湿式摩擦クラッチ	11・・・
クラッチケース	
12・・・駆動軸	13・・・
従動軸	
13a・・・段部	
14・・・平軸受	15・・・
球軸受	
16・・・スラスト軸受	17・・・
係合バネ	
20・・・内輪	21・・・
圧力板	
30・・・外輪	31・・・
押圧板	
32・・・受圧板	33・・・
内径サークリップ	
34・・・摩擦板	
40・・・クラッチカム	41・・・
カム軸	
42・・・カムレバー	43・・・
カム部	
50・・・制止板	55・・・
摩擦板	

【図1】



【図2】



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TITLE: CREEP PREVENTION DEVICE FOR MULTIPLE DISC CLUTCH

PUBN-DATE: December 15, 1998

INVENTOR-INFORMATION:

NAME

SATO, SHINJI

MOCHIZUKI, KIKUO

ASSIGNEE-INFORMATION:

NAME

COUNTRY

SHIN NIPPON HOIILE KOGYO KK

N/A

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ABSTRACT:

PROBLEM TO BE SOLVED: To provide a creep prevention device simple in structure, and excellent in durability by matching a braking unit simple in structure with the driven side of a clutch.

SOLUTION: Both an inner race 20 connected with a driving shaft 12 and an outer race 30 connected with a driven shaft 13, are housed in a clutch case 11, a pressing plate 21 supported by the inner race 20 is interposed between a pressure receiving disc 32 supported by the outer race 30 and a pressing disc 31, the pressing disc 31 is energized to the pressure receiving disc side by an engaging spring 17 interposed between the pressure receiving disc 32 and the outer race 30, concurrently a clutch cam is provided for the end part of the outer race 30, which presses the outer race 30 against the engaging spring 17

so as to retreat the pressing disc 31, and let a restraining plate 50 only the rotating direction of which is locked to the clutch case 11, be interposed between the clutch cam and the end part of the outer race 30, so that its driven side is thereby restrained while releasing operations are being carried out.

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Abstract Text - FPAR (1):

PROBLEM TO BE SOLVED: To provide a creep prevention device simple in structure, and excellent in durability by matching a braking unit simple in structure with the driven side of a clutch.

Abstract Text - FPAR (2):

SOLUTION: Both an inner race 20 connected with a driving shaft 12 and an outer race 30 connected with a driven shaft 13, are housed in a clutch case 11, a pressing plate 21 supported by the inner race 20 is interposed between a pressure receiving disc 32 supported by the outer race 30 and a pressing disc 31, the pressing disc 31 is energized to the pressure receiving disc side by an engaging spring 17 interposed between the pressure receiving disc 32 and the outer race 30, concurrently a clutch cam is provided for the end part of the outer race 30, which presses the outer race 30 against the engaging spring 17 so as to retreat the pressing disc 31, and let a restraining plate 50 only the rotating direction of which is locked to the clutch case 11, be interposed between the clutch cam and the end part of the outer race 30, so that its driven side is thereby restrained while releasing operations are being carried out.

## [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the approach and equipment for preventing the so-called creep with which some torque is especially transmitted at the time of release of a clutch about the suitable multiple disc clutch for a farm tractor.

[0002]

[Description of the Prior Art] Conventionally, in the operation of the lubricating oil which carries out the lubrication of the pressure plate, as a result of some driving force's being transmitted by release of a clutch from a driving shaft to a follower shaft, the phenomenon which a follower side drives at a low speed is known for the wet multiple disc clutch as a creep. Moreover, in order to prevent a creep, making a spring intervene between the press plates and shock plates which compress a pressure plate, and making it separate into it compulsorily was performed, but there was fault by which the effectiveness is reduced, so that the number of the pressure plates of a multiple disc clutch increased. On the other hand, the technique of controlling a follower side compulsorily when a friction clutch is released is used abundantly in the \*\*\*\* brake used in case its travelling direction of a tilling machine or a tractor is turned. That is, the power transfer capacity of same extent is given to the clutch which is intermittent in power, and the brake which brakes the wheel side which becomes a follower side in the \*\*\*\* brake. If it puts in another way, the thing of the magnitude of same extent is prepared.

[0003]

[Problem(s) to be Solved by the Invention] However, in having established the braking means same to a mere multiple disc clutch as a \*\*\*\* brake, structure became complicated and there was fault which equipment enlarges.

[0004]

[Means for Solving the Problem] The above-mentioned technical problem stores the outer ring of spiral wound gasket which stands in a row on the inner ring of spiral wound gasket which stands in a row to a driving shaft in a clutch case, and a follower shaft. While energizing a press plate to a shock plate side with the engagement spring which allotted the pressure plate supported moderately between the shock plates and press plates which were supported to said outer ring of spiral wound gasket, and was arranged between said shock plates and outer rings of spiral wound gasket The clutch cam which said engagement spring is resisted [ cam ] at the edge of said outer ring of spiral wound gasket, and an outer ring of spiral wound gasket is pressed [ cam ], and retreats a press plate is prepared, and it cancels by making the inhibition plate which stopped only the hand of cut in said clutch case intervene between said clutch cams and edges of an outer ring of spiral wound gasket. Moreover, it is desirable to attach friction material to either of said outer rings of spiral wound gasket and inhibition plates. Furthermore, a hard sintered alloy is desirable as the file plate.

[0005]

[Function] A driving shaft and a follower shaft pinch the pressure plate supported moderately between the press plates and shock plates which were formed in the outer ring of spiral wound gasket, compress it with an engagement spring, and make friction transmission of power possible. Moreover, if a clutch cam is operated, an outer ring of spiral wound gasket is pressed and a press plate is retreated, the friction engagement to the file plate and pressure plate which were prepared in the outer ring of spiral wound gasket will be canceled, and transfer of power will be intercepted. If the inhibition plate stopped by the clutch case intervenes between said outer rings of spiral wound gasket and clutch cams and a clutch cam is operated, an outer ring of spiral wound gasket and a clutch case will carry out friction engagement, and rotation of an outer ring of spiral wound gasket will be controlled. Since the friction material which becomes either of an outer ring of spiral wound gasket and an inhibition plate from a hard sintered alloy is attached, while an outer ring of spiral wound gasket is controlled by the stop plate and excessive drag torque is acting, the impact which slides moderately and which is given to a follower side is eased between them.

[0006]

[Example] Hereafter, the example of illustration using the invention in this application is explained. Ten

are the wet friction clutch of a multi-plate type among drawing. A friction clutch 10 has the clutch case 11 which combined the two half-sections divided into shaft orientations with the superposition bolt at the opening edge, and the driving shaft 12 which stands in a row in an engine, and the follower shaft 13 which stands in a row for a wheel are supported by it pivotable.

[0007] Inside the clutch case 11, the inner ring of spiral wound gasket 20 supported by the axis end of a driving shaft 12 by carrying out spline association and the outer ring of spiral wound gasket 30 supported by the axis end of the follower shaft 13 by carrying out spline association are arranged and supported within and without the same axle. The plain bearing to which 14 supported the driving shaft 12, and 15 are ball bearings which supported the follower shaft 13. Friction engagement of between these inner rings of spiral wound gasket 20 and an outer ring of spiral wound gasket 30 is carried out disengageable with the pressure plate 21 by which only shaft orientations were stopped by the inner ring of spiral wound gasket 20 movable, and the press plate 31 supported by the outer ring of spiral wound gasket 30, the file plate 34 with which only shaft orientations were supported by the slit movable and a shock plate 32. 16 is the thrust bearing of a needle form infixed between said inner rings of spiral wound gasket 20 and press plates 31.

[0008] The engagement spring 17 which consists of a disk spring between a rear face and the end face of said outer ring of spiral wound gasket 30 is \*\*\*\*(ed) by the compression condition, and the shock plate 32 is pressing the outer ring of spiral wound gasket 30 to the method of drawing Nakamigi while it is supported by the follower shaft 13 and migration of shaft orientations is prevented by the front thrust bearing 16 and step 13a on the back. Moreover, the press plate 31 is supported by only shaft orientations movable, and the stop is escaped from and carried out to the opening edge inside of said outer ring of spiral wound gasket 30 with the bore circlip 33. In this way, the press plate 31 is energized in the direction of a shock plate 32 by the elasticity of the engagement spring 17, and compresses said pressure plate 21 and file plate 34 between shock plates 32.

[0009] 40 is the handler slack clutch cam of a clutch. The clutch cam 40 has the cam section 43 of the boiled-fish-paste form which cut to the hemicycle the pars intermedia of the cam shaft 41 supported by the clutch case 11 free [ rotation ], and the cam lever 42 connected with the outer edge and said cam shaft 41, and was made by lacking, as drawing 2 shows. The cam lever 42 is connected with the clutch handler which is not illustrated [ clutch lever / clutch pedal or ], and when rotation actuation of the cam lever 42 is carried out, the cam section 43 of the clutch cam 40 presses the edge of an outer ring of spiral wound gasket 30, and makes it move it to a left all over drawing. Consequently, the press plate 31 retreats to a left among drawing, a pressure plate 21 is slippery, and transfer of power is no longer made. In addition, there are no configuration and great difference of the multiple disc clutch with which the above configuration is marketed conventionally.

[0010] By \*\*\*\*, the inhibition plate 50 is arranged at the invention in this application between said cam section 43 and the edge of an outer ring of spiral wound gasket 30. It fits in on the follower shaft 13, and only the hand of cut is stopped by said clutch case 11, and the inhibition plate 50 is supported so that it may not rotate, although some migration is permitted by shaft orientations. 55 is a braking file plate and is attached in the end face of an outer ring of spiral wound gasket 30 fixed if needed. 55a is hard \*\*\*\*\* made from the sintered alloy, and is baked on the 1 side of said braking file plate 55. In this way, if release actuation of the clutch cam 40 is carried out, the inhibition plate 50 will move to shaft orientations, and the edge of an outer ring of spiral wound gasket 30 will be contacted. If the clutch cam 40 is operated further at a release side, it will resist the engagement spring 17 through the inhibition plate 50, and will press and move an outer ring of spiral wound gasket 30 to a left. Consequently, a friction clutch 10 is released, connection on a driving shaft 12 and the follower shaft 13 is severed, and transfer of power is intercepted.

[0011] Said inhibition plate 50 carries out friction engagement at the outer ring of spiral wound gasket 30 currently rotated with actuation of the clutch cam 40, and controls the rotation. Therefore, an outer ring of spiral wound gasket 30 controls quickly rotation of an outer ring of spiral wound gasket 30 at the same time engagement to a pressure plate 21, the press plate 31, or a shock plate 32 is intercepted, and the so-called generating of a creep is prevented. In addition, although it is not indispensable



requirements to form the braking file plate 55 between the inhibition plate 50 and an outer ring of spiral wound gasket 30, friction increases by this between the inhibition plate 50 and an outer ring of spiral wound gasket 30, and the effectiveness of preventing said creep becomes remarkable. But in order to reduce wear, as for the inhibition plate 50, it is desirable [ the big braking load only of small time amount until transfer of power is actually severed with actuation initiation of the clutch cam 40 is that of \*\*\*\*\* , and / a file plate ] to stick a sintered alloy well-known as an ingredient for oilless bearings.

[0012]

[Effect of the Invention] Since according to invention of claim 1 a follower side is controlled by the inhibition plate at the same time a friction clutch is intercepted, the fault the rotation drive of the follower side is succeedingly carried out by the creep is canceled. Moreover, the effectiveness of creep exclusion is acquired by the easy structural change which makes an inhibition plate intervene between the existing clutch cam and an outer ring of spiral wound gasket. According to invention of claim 2, since big damping force is acquired by friction material even if the increase of frictional force and a friction surface product are small, there is effectiveness which can miniaturize equipment between an outer ring of spiral wound gasket and an inhibition plate. According to invention of claim 3, the endurance of the friction material put on a severe friction environment does not need to be spoiled until friction material is used as a hard sintered alloy, and big frictional force is acquired and also power is intercepted from release actuation of a clutch. There is which effectiveness.

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